

1-38. (CANCELED)

39. (CURRENTLY AMENDED) An apparatus for machining a metallic workpiece being one of strip or plate form and having first and second opposed main surfaces and extending therebetween at least an edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs ~~[[for]]~~ at least one of removing an oxide layer, grinding, deburring and descaling ~~from a surface at least the edge surface grinding a surface or an edge and treating or deburring a surface or edge of at least one of the first and the second main surfaces of the workpiece,~~

wherein the apparatus comprises at least first, second, third and fourth conveyor devices (2, 2, 2, 2) and each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) has at least one brush (3), each of at least the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) guides the respective at least one brush (3) at least approximately linearly along the first main surface and the edge surface ~~past a region~~ of the workpiece (1) to be machined ~~one of obliquely or more~~ transversely with respect to an advance direction of the workpiece (1), two of the conveyor devices (2,2) rotate in opposite directions and are positioned for treating ~~the first main surface~~ at least the edge surface of the workpiece (1), the two other conveyor devices (2,2) rotate in opposite directions and are positioned for treating at least the edge surface of the workpiece (1), and the first, second, third and the fourth conveyor devices (2, 2) rotate so as to guide the brushes (3) along an entirety of a length of the apparatus available for the workpiece to pass through; and

wherein the at least one brush of each of the first and second conveyor devices machine substantially all the edge surface of the workpiece in opposite directions, and the at least one brush of each of the third and fourth conveyor devices machine substantially all the edge surface of the workpiece in opposite directions.

40. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein at least the first, the second, the third and the fourth conveyor devices (2) are arranged in a standing position, so that the at least one brush (3) of each of at least the first, the second, the third and the fourth conveyor devices (2) runs one of substantially vertically along the workpiece (1) in the standing position, or in a lying position, so that the at least one brush (3) runs substantially horizontally along the workpiece (1) in [a] the lying position.

41. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein the workpiece (1) is guided between the first and the second conveyor devices (2) such that each of the first and the second conveyor devices (2) machine one of the first and the second main surfaces (1c) of the workpiece (1).

42. (PREVIOUSLY PRESENTED) The apparatus according to claim 41, wherein the direction of rotation of the first and the second conveyor devices (2) is selected such that the brushes (3) of the first and the second conveyor devices (2) are guided past the opposed first and the second main surfaces (1c) of the workpiece (1) in a same direction.

43. (PREVIOUSLY PRESENTED) The apparatus according to claim 40, wherein the direction of rotation of the first and the second conveyor devices (2) arranged in the standing position is selected such that the at least one brush (3) of the at least first and the second conveyor devices (2) is guided past the workpiece (1) in one of the direction of a base plate (9), or from a top of the apparatus downward.

44. (PREVIOUSLY PRESENTED) The apparatus according to claim 40, wherein the direction of rotation of the first and the second conveyor devices (2) arranged in the lying position is selected such that the at least one brush (3) of the first and the second conveyor devices (2) is guided along the workpiece (1) in the direction of a delimiting plate which guides the workpiece (1) at one side.

45. (CANCELED)

46. (CURRENTLY AMENDED) An apparatus for machining a metallic workpiece, being one of strip or plate form and having first and second opposed main surfaces and extending therebetween at least an edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs ~~[[for]]~~ at least one of removing an oxide layer, grinding, deburring and descaling the edge surface ~~grinding a surface or an edge and deburring a surface or edge of at least one of the first and the second main surfaces of the~~ workpiece, ✓  
✓  
✓  
✓  
✓

the apparatus comprises at least first and second conveyor devices (2, 2) and each of the first and second conveyor devices (2, 2) has at least one brush (3), each of ~~[[the]]~~ at least the first and the second conveyor devices (2, 2) guides the respective at least one brush (3) at least approximately linearly past ~~a region~~ the edge surface of the workpiece (1) to be treated; ~~and~~ ✓  
✓

~~wherein~~ the first and the second conveyor devices (2, 2) rotate in opposite directions and the first conveyor device (2) machines ~~the first main surface~~ at least the edge surface of the workpiece (1) while the second conveyor device (2) machines ~~the second main surface~~ at least the edge surface of the workpiece (1), and the first and the second conveyor devices (2) are arranged slightly offset with respect to one another in the advance direction in which the workpiece (1) passes through; and ✓  
✓  
✓  
✓

wherein the at least one brush of each of the first and second conveyor devices machine the edge surface of the workpiece in opposite directions to ensure that substantially all the edge surface of the workpiece is machined. ✓  
✓  
✓

47. (CANCELED)

48. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein each of at least the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) has a plurality of brushes (3) arranged at a spacing distance from one another.

49. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, further comprising a guide passage (4), which is set to a thickness of the workpiece (1) and by which the workpiece (1) is displaced with guidance, transversely with respect to the direction of rotation of the at least one of the first, the second, the third and the fourth conveyor devices (2).

50. (PREVIOUSLY PRESENTED) The apparatus according to claim 41, further comprising an adjustment means for adjusting the first and the second conveyor devices (2) with respect to one another to correct for wear of the at least one brush (3).

51. (CANCELED)

52. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein bristles (12) of the at least one brush (3) of each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) are formed as one of intertwined bristles and abrasive bristles.

53. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein bristles (12) of the at least one brush (3) of each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) are each parallel inclined by up to 45° and a tip of each bristle is located in front of an opposite end of each respective bristle in the direction of rotation. ✓

54. (CANCELED)

55. (PREVIOUSLY PRESENTED) The apparatus according to claim 52, wherein a bundle (120) of bristles (12) is surrounded by a stabilizing and supporting sheath (21).

56. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein the at least one brush (3) or bristles (12) of the at least one brush (3) is coupled to a respective conveyor device (2) by one of a bond, a screw and a weld.

57. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein the rotational speed of the at least one brush (3) is between 5 to 30 m/sec.

58. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) has an independent drive.

59. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is one of a V-belt (13), a toothed belt, a flat belt with studs and a chain.

60. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is a triple V-belt (13a, 13b, 13c), with a middle V-belt (13a) accommodating the brushes (3).

61. (PREVIOUSLY PRESENTED) The apparatus according to claim 59, wherein the V-belt (13) is formed from at least one of rubber, plastic, synthetic rubber and neoprene.

62. (PREVIOUSLY PRESENTED) The apparatus according to claim 59, wherein the V-belt has a polyurethane covering layer (14), and a carrier (15), which is formed from one of rubber or plastic, for one of the brush (3) or bristles (12) of the brush (3), is coupled to the PU covering layer (14) by a weld.

63. (PREVIOUSLY PRESENTED) The apparatus according to claim 59, wherein a carrier (15), which is preferably formed from one of rubber or plastic, for one of the brush (3) or bristles (12) of the brush (3) is coupled to the V-belt (13) by one of a screw, a rivet, a bond, a weld and a clip.

64. (PREVIOUSLY PRESENTED) The apparatus according to claim 63, wherein a top side of the V-belt (13) communicates with the carrier (15), the top side having one of elevations or protuberances (17) for one of guiding and supporting the carrier.

65. (PREVIOUSLY PRESENTED) The apparatus according to claim 62, wherein the carrier retains the bristles (12) in bundles (120).

66. (PREVIOUSLY PRESENTED) The apparatus according to claim 62, wherein the carrier (15) is formed from one of a plurality of individual segments (15b) or has slots (16) transverse aligned with respect to the direction of rotation of the conveyor device (2), the plurality of segments (15b) or pieces (15a) separated by the slots (16) having a length of from 10 to 40 mm.

67. (PREVIOUSLY PRESENTED) The apparatus according to claim 66, wherein each of the segments (15b) have a groove (18) in one of a leading or trailing end and a tongue (19) in the other of a leading or trailing end, by which the segments (15b) are connected to one another.

68. (PREVIOUSLY PRESENTED) The apparatus according to claim 66, wherein between two to four adjacent segments (15b) or adjacent pieces (15a) separated by the slots (16), have bristles (12) and together form the brush (3).

69. (PREVIOUSLY PRESENTED) The apparatus according to claim 68, wherein between one to three adjacent bristle-free segments (15b) or pieces (15a) are arranged between the brushes (3) of a V-belt (13).

70. (PREVIOUSLY PRESENTED) The apparatus according to claim 66, wherein each of the adjacent pieces (15a) or segments (15b) are separated by approximately 3 to 20 mm.

71. (PREVIOUSLY PRESENTED) The apparatus as claimed claim 39, wherein a resistance element (23) is located downstream [[of]] from a diversion point (22) of the conveyor device (2), as seen in the direction of rotation, before one of the brush (3) or bristles (12) resumes contact with the metallic workpiece (1).

72. (CURRENTLY AMENDED) The apparatus according to claim 71, wherein the resistance element (23) is located in [[the]] a region in which the brush (3) or bristles (12) leave a circular path produced by the diversion point (22) of the conveyor device (2) and returns to one of a linear or rectilinear movement. ✓

73. (PREVIOUSLY PRESENTED) The apparatus according to claim 71, wherein the resistance element (23) mechanically prevents the bristles (12) from yielding in the direction of rotation.

74. (PREVIOUSLY PRESENTED) The apparatus according to claim 73, wherein the resistance element (23) is introduced into a path of the brush (3) or bristles (12) such that tips of the bristles (12) butt against the resistance element.

75. (PREVIOUSLY PRESENTED) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is a V-belt having bristles (12), which are coupled onto a top side of the V-belt by one of a bond, a screw and a weld, either directly or via a carrier, and the bristles (12) are inclined by up to 45° in the direction of rotation of the V-belt.

76. (CURRENTLY AMENDED) A method for machining a metallic workpiece, in strip or plate form and having first and second opposed main surfaces and extending therebetween  
at least an edge surface angularly disposed relative to the first and second opposed main  
surfaces, the method including the step of:

~~for at least one of removing an oxide layer, grinding [[a]] the edge surface or~~  
~~edge and treating or deburring [[a]] the edge surface or edge of the workpiece, the method~~  
further comprising the steps of:

providing first, second, third and fourth conveyor devices (2) each having at least one brush (3);

operating the first, the second, the third and the fourth conveyor devices (2) such that the at least one brush (3) runs at least approximately linearly across a desired surface of the workpiece (1);

guiding the workpiece (1) past the first, the second, the third and the fourth conveyor devices (2) transversely with respect to a direction of rotation of the first, the second,

the third and the fourth conveyor devices (2) the first conveyor device (2) machining a first surface of the workpiece and the edge surface and the second conveyor device (2) machining a second surface and the edge surface, the third conveyor device (2) machining the first surface and the edge surface and the fourth conveyor device (2) machining the second surface and the edge surface, the first and the third conveyor devices rotating in opposite directions and the second and the fourth conveyor devices rotating in opposite directions;

aligning the first and second conveyor devices in an offset manner along a travel direction of the workpiece on the opposite first and second sides of the workpiece and aligning the third and fourth conveyor devices in an offset manner also along the travel direction of the workpiece on the opposite first and second sides of the workpiece; and

ensuring contact and complete machining of the edge surface between the at least one brush (3) of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) along the entire respective ~~first and second~~ edge surface of the workpiece.

77. (CANCELED)

78. (CURRENTLY AMENDED) An apparatus for machining a metallic workpiece, being one of strip or plate form and having first and second opposed main surfaces and extending therebetween at least an edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs ~~[[for]]~~ at least one of removing an oxide layer ~~from a surface, grinding a surface or an edge and treating~~ ~~[[or]]~~ and deburring ~~[[a]]~~ the edge surface ~~between or edge of at least one of~~ the first and the second main surfaces of the workpiece, the apparatus comprising:

a first and a second conveyor devices (2, 2) and each of the first and second conveyor devices (2, 2) has at least one brush (3) guided at least approximately linearly past a region of the workpiece (1) to be machined transversely with respect to an advance direction of the workpiece (1);



the first and second conveyor devices (2,2) rotate in opposite directions and are positioned for respectively treating the ~~first and second main edge~~ surface of the workpiece (1); ✓  
and

the first and second conveyor devices (2, 2) both rotate so as to guide the brushes (3) along an entirety of the ~~first and second main edge~~ surface of the workpiece. ✓

79. (NEW) The apparatus according to claim 78, wherein a plurality of bristles (12) of the at least one brush (3) of each of the first and the second conveyor devices (2, 2, 2, 2) are each parallel inclined by up to 45° and a tip of each of the plurality bristle is located in front of an opposite end of each respective bristle in the forward direction of rotation of the first and second conveyor devices.

80. (NEW) An apparatus for machining a metallic workpiece having a strip or plate form defined by a first and second opposed main surfaces and at least a side edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs at least one of removing an oxide layer, grinding, treating and deburring at least substantially all the edge surface angularly disposed between the first and the second main surfaces of the workpiece, the apparatus comprising:

a first conveyor device (2) supporting at least a first brush (3);

a second conveyor device (2) supporting at least a second brush (3);

a guide passage for receiving and guiding the metallic work piece in an advancing direction between the first and second brushes of the respective first and second conveyor devices;

a region defined by the guide passage where the first and second brushes contact the metallic workpiece to the extent that at least the side edge surface is fully machined;  
and

wherein the first and second brush each comprise a plurality of substantially parallel aligned bristles supported in a carrier segment and each of the parallel bristles are inclined at an angle of up to 45 degrees relative to the carrier segment.

81. (NEW) The apparatus for machining a metallic workpiece as set forth in claim 80 wherein a tip of each parallel aligned and inclined bristle is located forward in the direction of travel of the brush relative to an end of the bristle secured in the carrier segment to facilitate machining of the side edge surface of the metallic workpiece.

82. (NEW) The apparatus for machining a metallic workpiece as set forth in claim 81 wherein the carrier segment supporting the parallel aligned bristles comprises a groove on a first end of the carrier segment and a tongue on second end of the carrier segment by which a plurality of similar carrier segments may be connected together so as to prevent twisting of the individual segments relative to one another.

83. (NEW) The apparatus according to claim 46, wherein bristles (12) of the at least one brush (3) of each of the first and the second conveyor devices (2, 2) are each parallel inclined by up to 45° and a tip of each bristle is located in front of an opposite end of each respective bristle in the direction of rotation.

84. (NEW) The apparatus according to claim 83, wherein the bristles (12) of the at least one brush (3) of each of the first and the second conveyor devices (2, 2) are each parallel inclined at about 15° and the tip of each bristle is located in front of the opposite end of each respective bristle in the direction of rotation.

85. (NEW) The apparatus according to claim 53, wherein the bristles (12) of the at least one brush (3) of each of the first, second, third and fourth conveyor devices (2, 2, 2, 2) are

each parallel inclined at about 15° and the tip of each bristle is located in front of the opposite end of each respective bristle in the direction of rotation.

86. (NEW) A carrier segment for use as a component of a brush for an apparatus for machining a metallic workpiece, the apparatus having at least a first and a second conveyor each having at least one brush for undertaking one of removing an oxide layer, grinding, treating and deburring at least one of a first and second main surfaces of the metallic workpiece and an edge surface angularly disposed between the first and second main surfaces, the carrier segment comprising:

a base supporting a plurality of bristles forming the brush; and

wherein the plurality of bristles (12) supported in the base of the carrier segment are each parallel inclined by up to 45° relative to the base of the carrier segment.

87. (NEW) The carrier segment according to claim 86, wherein the plurality of bristles supported by the brush (3) of each of the at least first and second conveyor devices (2, 2) are each parallel inclined at about 15°.

88. (NEW) The carrier segment according to claim 86 wherein a tip of each parallel aligned and inclined bristle is located forward in the direction of travel of the brush relative to an end of the bristle secured in the carrier segment to facilitate machining of the side edge surface of the metallic workpiece.

89. (NEW) The carrier segment according to claim 86 wherein the carrier segment supporting the parallel aligned bristles comprises a groove on a first end of the carrier segment and a tongue on second end of the carrier segment by which a plurality of similar carrier segments may be connected together so as to prevent twisting of the individual segments relative to one another.